CLAIMS (for US preliminary amendment, based on claims filed under Article 34 of the PCT on February 5, 2001)

SUB A2

1. Apparatus for the encoding of relative position comprising a first substrate [(2)] having a first plurality of light transmitting and light blocking regions forming in aggregate a first object pattern of juxtaposed stripes [(20)] in an object plane [(3)]; a second substrate [(1)] positioned relative to and/or spaced from said first substrate; first convergent means [(4)] fixed to said second substrate for substantially collimating in a first orthogonal plane, being orthogonal to said object plane, light from points of said first object pattern to reimage said light in a first image plane and form, in use, a first image pattern at said first image plane corresponding to said first object pattern; and first image detection means [(7)] positioned at said first image plane for capturing a first image portion comprising a portion of said first image pattern, characterised in that said first image portion, corresponding to said juxtaposed stripes, has alternating and juxtaposed light and dark regions [(9, 10, 11)] the widths, by determination in use of at least one thereof, and sequence of which unambiguously define the location of said first image portion within said first image pattern [(8)] along a first image axis corresponding to a first object axis [(A1)] at said first object pattern whereby the relative position along said first object axis of the first substrate relative to the second substrate is determined.

SUB B1

2. Apparatus as claimed in Claim 1 in which the second substrate is a lenticular screen; the first convergent means comprises a first cylindrical lens element of said screen; and the first orthogonal plane is orthogonal to the longitudinal axis of said first cylindrical lens element.

SUB C2

3. Apparatus as claimed in Claim 2 including elongate aperture means [(5, 22)] fixed with respect to the lenticular screen and arranged to block light which passes through lens elements adjacent to the first cylindrical lens element.

SUB B2

4. Apparatus as claimed in Claim 3 in which the aperture means comprises an opening in an opaque coating on a portion of the front surface of the lenticular screen

5. Apparatus as claimed in Claim 1 [any preceding claim] in which the widths of the light and dark regions are determined by locating, with the first image detection means, at least three boundaries between the images of said light and dark regions within said first image portion thereby providing the data to unambiguously define the identity of one of the corresponding

B2 End

juxtaposed stripes and the location thereof along the first object axis relative to the first convergent means.

6. Apparatus as claimed in Claim 1 [any preceding claim] in which the first substrate has a second plurality of light transmitting and light blocking regions forming in aggregate a second object pattern [(21)] in the object plane; second convergent means fixed to the second substrate for substantially collimating in a second orthogonal plane, being orthogonal to said object plane, light from points of said second object pattern to reimage said light in a second image plane and form, in use, a second image pattern at said second image plane corresponding to said second object pattern; and second image detection means positioned at said second image plane for capturing a second image portion comprising a portion of said second image pattern, in which said second image portion has light and dark regions the widths, by determination in use of at least one thereof, and sequence of which unambiguously define the location of said second image portion within said second image pattern along a second image axis corresponding to a second object axis at said second object pattern whereby the relative position along said second object axis of the first substrate relative to the second substrate is determined.

Sub B3

7. Apparatus as claimed in Claim 6 in which the first image portion's location along the first image axis provides a first ordinate; the second image portion's location along the second image axis provides a second ordinate; and said first and second ordinates are combined to provide the position of the first substrate relative to the second substrate.

Sub C5

8. Apparatus as claimed in Claim 7 in which the first and second patterns are tapered so that the width of each stripe reduces from one end to the other.

Sub B4

9. Apparatus as claimed in Claim 7 in which the first object axis [(A1)] and the second object axis [(A2)] are inclined with respect to eachother and, in use, the position of the first substrate relative to the second substrate is provided in two orthogonal directions.

10. Apparatus as claimed in Claim 7 in which the second substrate is a lenticular screen having a tapered structure in which the first convergent means comprises a first cylindrical lens element of said screen having a first principal axis and the second convergent means comprises a second cylindrical lens element of said screen spaced from said first lens element and having a second principal axis and in which said first and second principal axes are inclined with respect to eachother.

Sub C7

11. Apparatus as claimed in Claim 9 comprising means for controlling the relative positions of the substrates in the two orthogonal directions.

SUB A3 7

12. Apparatus as claimed in any preceding claim in which at least one of the image detection means comprises a linear CCD array.

Sub B5

13. Apparatus as claimed in Claim 1 [any preceding claim] in which the first substrate comprises a barrier screen and the first and second substrate provide in combination at least one viewing zone for an autostereoscopic display system.

SUB A4 7

14. A method for encoding the position of a first substrate [(2)] relative to a second substrate [(1)] which comprises the steps of forming a first object pattern [(20)] in an object plane [(3)] by providing a first plurality of light transmitting and light blocking regions in the form of juxtaposed stripes on said first substrate; providing first convergent means [(4)] fixed to said second substrate and positioning said second substrate relative to and/or spaced from said first substrate; substantially collimating with said first convergent means in a first orthogonal plane light from points of said first object pattern and reimaging said light in a first image plane to form a first image pattern at said first image plane corresponding to said first object pattern; positioning first image detection means [(7)] at said first image plane and capturing a first image portion comprising a portion of said first image pattern, characterised by determining, by means of the capturing step, the widths and sequence of light and dark regions [(9, 10, 11)] within the first image portion and unambiguously defining, thereby, the location of said first image portion within said first image pattern [(8)] along a first image axis corresponding to a first object axis [(A1)] at said first object pattern and the position along said first object axis of the first substrate relative to the second substrate.

Sub B5

15. The method of Claim 14 which includes arranging the first plurality of juxtaposed transmitting and blocking stripes to comprise a selection of respective gaps and widths in such a manner that a particular sequence of said gaps and widths is not repeated within said first object pattern; locating with the first image detection means at least three boundaries between the corresponding light and dark regions in the first image portion and thereby establishing the identity of a corresponding stripe in the first object pattern and the location thereof along the first object axis relative to the first convergent means.

16. The method of Claim 14 which includes the steps of providing a second plurality of light transmitting and light blocking regions in the form of juxtaposed stripes on said first substrate forming in aggregate a second object pattern [(21)] in said object plane; providing second convergent means fixed relative to said second substrate and substantially collimating therewith, in a second orthogonal plane, light from points of said second object pattern; reimaging said light in a second image plane to form a second image pattern at said second image plane corresponding to said second object pattern; positioning second image detection means at said second image plane and capturing a second image portion comprising a portion of said second image pattern; providing, by means of the capturing step, the widths and sequence of light and dark regions within the second image portion and unambiguously defining, thereby, the location of said second image portion within said second image pattern along a second image axis corresponding to a second object axis [(A2)] at said second object pattern and inclined to the first object axis [(A1)]; and, thereby, determining the relative position in two orthogonal directions of the first substrate relative to the second substrate.

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